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## Miscellaneous Mistletoe Notes, 37–47

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**ABSTRACT.** The following new species are proposed: *Cladocolea nitida* Kuijt, *C. peruviansis* Kuijt, *Struthanthus andersonii* Kuijt, *S. lewisii* Kuijt, *S. longibracteatus* Kuijt, and *S. tortistylus* Kuijt (Loranthaceae), *Dendrophthora equisetoides* Kuijt, *D. harlingii* Kuijt, and *D. meridana* Kuijt (Viscaceae). Additionally, two transfers are made, one to *Cladocolea*, *C. alternifolia* (Eichler) Kuijt (Loranthaceae), and one to *Dendrophthora*, *D. warmingii* (Eichler) Kuijt.

**Key words:** *Cladocolea*, *Dendrophthora*, Loranthaceae, Neotropical, *Struthanthus*, Viscaceae.

This paper, like the earlier ones in this series as cited below, presents a number of new taxa and new combinations and related elucidations that are not part of my continuing monographic studies of the two main mistletoe families (Loranthaceae and Viscaceae) of the New World. The earlier installments are found in Kuijt (1980, 1987) and Kuijt and Kellogg (1996).

### LORANTHACEAE

**37. *Cladocolea alternifolia*** (Eichler) Kuijt, comb. nov. Basionym: *Phthirusa alternifolia* Eichler, Flora Brasil. 5(2): 66. 1868. TYPE: Brazil. Rio de Janeiro: Copacabana, 29 Oct. 1867, A. F. M. Glaziou 2142 (lectotype, designated by Kuijt (1994b), BR; isolectotypes, B, P.) Figures 1, 2.

### AMENDED DESCRIPTION:

Rather densely leafy, glabrous, sympodial, the apex aborting and 1 to 3 axillary buds of the uppermost leaves continuing growth. Stems slightly angular when young, soon becoming terete. Leaves to  $9 \times 4$  cm, ovate, apex acute, often somewhat attenuate, base obtuse, petiole ca. 3 mm, flattened and winged above, venation pinnate; phyllotaxy alternate throughout. Inflorescence, including the flowers, no more than 3 mm long, often 2 or 3 per leaf axil, consisting of 3 to 5 flowers on a short axis of  $< 0.5$  mm, each flower subtended by a smooth-margined bract. Flowers possibly bisexual, rounded

in bud, ca. 2 mm long. Petals 6, nearly 2 mm long, dimorphic, anthers with 4 thecae, upper anthers somewhat shorter than lower ones, style the full length of the flower, the upper portion more slender, compressed between anthers in the bud; nectary ring 6-angled.

N. B. Van Tieghem (1895: 172) listed “*alternifolia* (Eichl.)” as a candidate for inclusion in the genus *Passowia* Karsten but did not actually make that combination. This genus has not been accepted by subsequent workers but, in Van Tieghem’s usage, corresponds to present-day *Phthirusa*, differing from *C. alternifolia* in its triadic inflorescences and unusual stamen morphology (see Kuijt & Kellogg, fig. 11).

The base of the plant is not included in any of the material I have seen. It is not known, therefore, whether basal epicortical roots are developed.

The inflorescence in *Cladocolea alternifolia* is so small and short that the question may well be asked whether the flowers are not separately sessile in the leaf axil, as in *Ixocactus*. This is not so, however, as the entire unit is attached at a single point, and we therefore have an inflorescence before us (Fig. 1b–e).

There is a striking overall similarity between this rare species, and the even more rare *Ixocactus macrophyllus* Kuijt from Bahia (Kuijt, 1994a). The two species have very similar leaves as well as miniscule flowers crowded into the leaf axils. Upon closer scrutiny, however, the structural differences loom large. *Ixocactus macrophyllus* has tetramerous flowers with isomorphic petals, a massive style terminating in a distinctive, capitate stigma, and its phyllotaxy is decussate. The present species has hexamerous flowers, strongly dimorphic petals and stamens, and its style is much more slender, the stigma indistinct. With regard to the styler features, however, it must be remembered that we do not know these in the male flower of *I. macrophyllus*; neither do we know with certainty whether *C. alternifolia* is dioecious or whether it has bisexual flowers and, therefore, what the style and stigma of a female flower might look like.



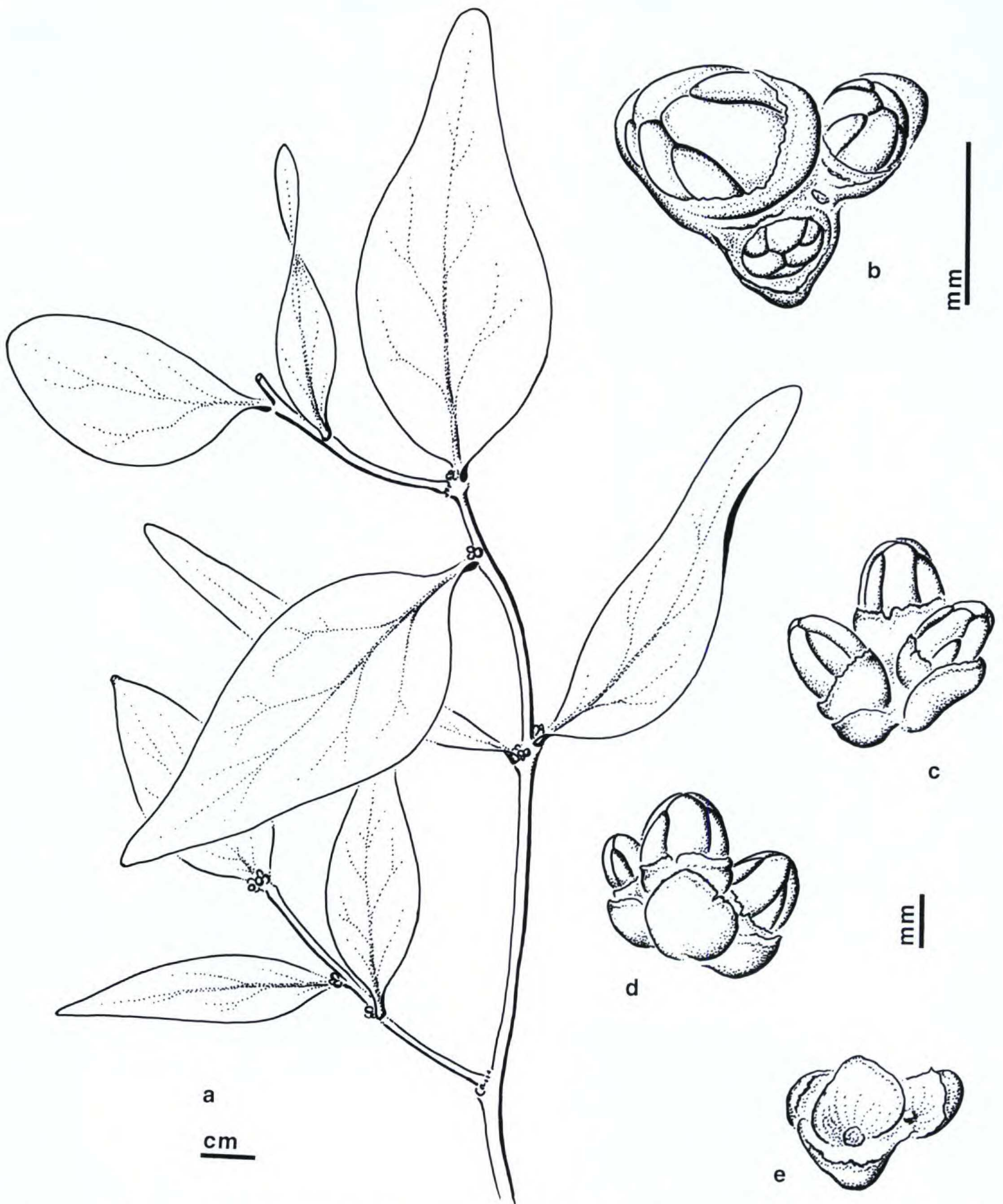


Figure 1. *Cladocolea alternifolia* (Eichler) Kuijt. —a. Habit. —b–e. Three-flowered inflorescence as seen from different directions, part e with flower buds removed to show the absence of bracteoles. Drawn from *Glaziou 4011* (P).

Following the present understanding of generic delimitations, there appears to be no other option but to place the species in *Cladocolea*, the only known small-flowered Neotropical genus in the family in which ebracteolate inflorescences occur. Within that genus, however, *C. alternifolia* occupies an isolated position, both taxonomically and geo-

graphically. In terms of affinity as well as proximity, the nearest species may be *C. roraimae* (Steyermark) Kuijt from Mt. Roraima, Venezuela (Kuijt, 1975a; see also the comments under *C. peruviana*, below).

*Cladocolea alternifolia* is now likely to be extinct; the only specimen collected since 1870



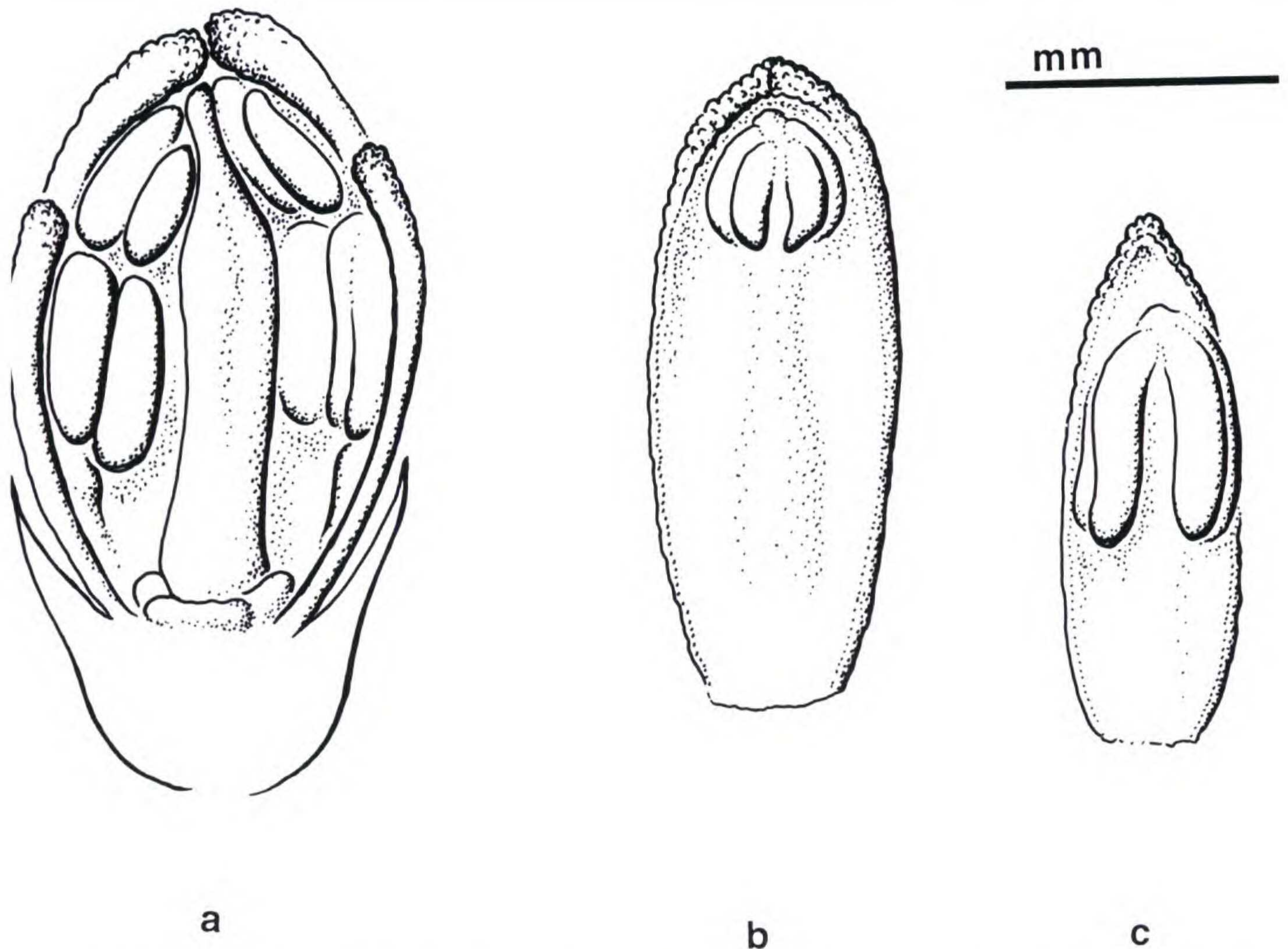


Figure 2. *Cladocolea alternifolia* (Eichler) Kuijt, floral dissection. —a. Mature bud, partly cut away, showing the natural position of elements. —b, c. Dimorphic petals and anthers. Drawn from *Glaziou 4011* (P).

seems to be *Apparicio & Brade 20118*, São Paulo, Serra da Bocaina, on Monimiaceae (RB), which I have not seen (Rizzini, 1956).

*Additional specimens seen.* BRAZIL. **Rio de Janeiro:** “versant de Copacabana,” 26 Jan. 1870, *Glaziou 4011* (P), s.l., *Schott 4584* [with note “commé. par l’Herbier de Vienne,” label written in Van Tieghem’s hand, incl. “*Pasowia alternifolia*” and “*Phthirusa alternifolia* Eichler.”]

**38. *Cladocolea nitida*** Kuijt, sp. nov. TYPE: Guyana. Potaro-Siparuni region: Pakaraima Mountains, Mt. Wokomung, ridgeline 0.5 km NE of Wokomung escarpment adjacent Ka-Mie-Wah pinnacle, 5°4’N, 59°53’W, 1400–1500 m, medium canopy cloud forest, 15 Nov. 1993, flowers light green, very fragrant, *T. W. Henkel, R. Williams, S. Fratello & P. Joseph 4400* (holotype, LEA; isotype, US). Figure 3.

Planta dioecia parce ramosa. Folia opposita, obovata, nitida. Inflorescentia determinata, ex floribus ebracteolatis sessilibus in monades 3 dispositis constans. Flos ca. 4.5 mm longus, petalis 5, stylo recto, stigmatate capitato.

Plants dioecious, sparsely branched, glabrous, stems quadrangular at least when young. Leaves regularly paired, to 5 × 2 cm, of which the slender

petiole is ca. 1 cm. Blade obovate, upper surface very shiny when dry, lower surface dull, the pinnate venation and minor venation clearly marked on both sides; apex rounded to notched or sometimes somewhat mucronulate; base acute. The type female; male plants not known. Female inflorescence 1 per axil, flanked by 2 acute prophylls becoming torn and corky with time, inflorescence including flowers 5 mm, determinate, consisting of 7 flowers in 3 decussate pairs plus 1 terminal one, all flowers ebracteolate, the lowest ones each subtended by one caducous bract 2 mm long, others apparently ebracteate. Flowers 4.5 mm long of which 1 mm ovary with flaring, entire calyculus; petals 5, each with minute, elongate, staminodial cushion; style nearly as long as petals, surrounded by nectary disk at base; stigma capitate, very prominent, 0.75 mm wide. Fruit not known.

*Cladocolea nitida* is closely related to *C. elliptica* Kuijt from Suriname (Kuijt, 1992), being similar in basic inflorescence structure and the curious, staminodial ridge. *Cladocolea elliptica*, however, has no evident venation, while *C. nitida* has shiny, rather thin leaves on which even the minor venation is



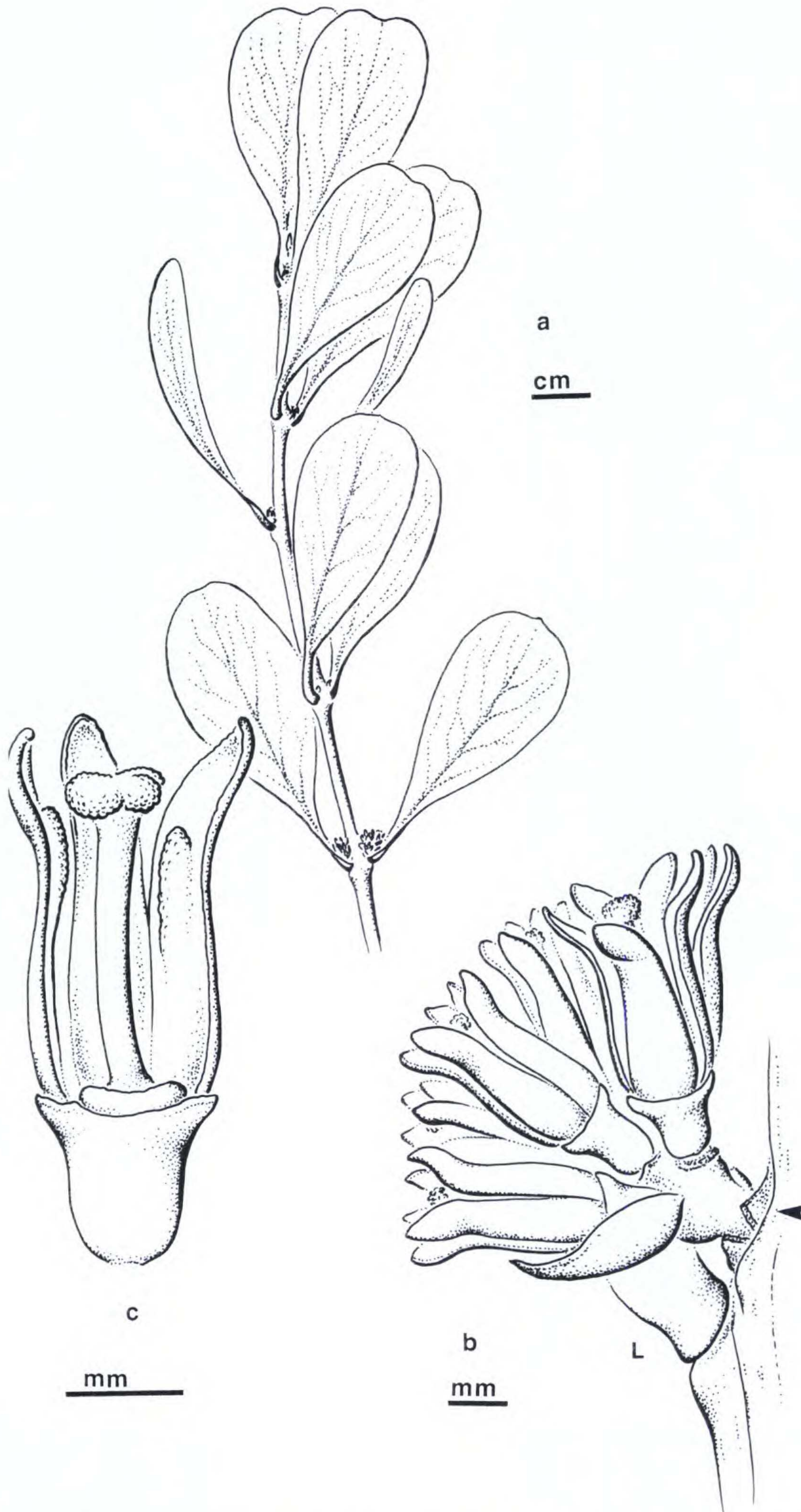


Figure 3. *Cladocolea nitida* Kuijt. —a. Habit. —b. Female inflorescence, 5 of the 7 flowers visible, in axil of foliage leaf (L); one floral bract is still in place. The arrow indicates a split, corky prophyll subtending the inflorescence. —c. Floral dissection of female flower, the nearest 2 petals removed. Drawn from *Henkel et al. 4400* (LEA).



visible in remarkable detail. *Cladocolea nitida* is pentamerous and has only single flowers in alternate positions, while *C. elliptica* is tetramerous and has at least some (paired) triads in the lowest positions in the inflorescence. Other striking differences are the absence of any scurfy surface even in the youngest twigs of *C. nitida*, and its extremely large stigma. *Cladocolea nitida* is known only from the type collection.

**39. *Cladocolea peruviana* Kujit, sp. nov.**

TYPE: Peru. San Martín: Rioja–Pomacochas road, below Venceremos, ca. 20 km NW of Rioja near Restaurant El Amigo, 05°45'S, 77°38'W, 1600 m, 8 Feb. 1984, A. Gentry & D. N. Smith 45173 (holotype, MO; isotype, LEA). Figure 4.

Planta dioecia. Innovationibus ut videtur determinatis. Folia opposita, lanceolata. Inflorescentia determinata, a floribus brevipedicellatis in monades 2 ad 6 dispositis constans. Flos petalis 4, antheris dimorphis.

Plants dioecious, stems somewhat angular-grooved to terete, lacking lenticels when leaf-bearing, internodes to 3 cm long, older nodes somewhat swollen, phyllotaxy paired; innovations with 3 to 8 pairs of leaves, after which the apex apparently aborts, primary axillary buds continuing growth the following season. Leaves to 10 × 5 cm, lanceolate to ovate, base of blade tapering into an indistinct petiole, which is flat and winged above, the wingless part 3–4 mm long; apex obtuse to acute but not attenuate; blade shiny above, dull below, venation pinnate with numerous lateral veins, the minor venation distinct above. The type male; female plants not known. Male inflorescence 7–9 mm long, most of which is flowers, on older growth only, at first subtended by several pairs of yellowish, papery bracts, the axis ca. 5 mm long, with 2 or 3(4) pairs of lateral, ebracteolate flowers and one terminal one, each with a pedicel ca. 0.6 mm long, the subtending bracts small and caducous; inflorescence base surrounded by corky crater; mature bud 4.5 mm long, of which ovary 1 mm, slender, calyculus nearly smooth; petals 4, 3.5 mm long, strap-shaped, scarcely dimorphic; anthers 1 mm long, sessile on upper part of petal, dimorphic, with 4 locules, connective not extending beyond pollen sacs, filament fused with petal, forming a downward ridge to near the base of the petal; style lacking, center of the flower with a flat cushion with papillar surface.

*Paratypes.* ECUADOR. **Zamora-Chinchipec:** area of Estación Científica San Francisco, around km 30 on road Loja–Zamora, E of Ceja Andina (3°58'18"S, 79°4'44"W); moist montane forest, on Meliaceae, 1800 m, *Bussman et al.* 12594 (MO). PERU. **Cajamarca:** San Ignacio, San

José de Lourdes, base of Cerro Picorana, remains of Andean forest, 45°9'25"S, 78°54'15"W, 2010 m, *Díaz & Fernández* 10152 (LEA).

The sexual status of *Bussman et al.* 12954 is uncertain, but it is said that the berries are black; the other specimens seen are male.

Surprisingly, considering the 2000 km across the Amazon basin separating provenances, the most convincing affinities of the new species *Cladocolea peruviana* appear to be with *C. roraimensis* (Steyermark) Kujit, which is known only from Mt. Roraima (Kujit, 1975a). Both species have very short, determinate inflorescences subtended by several pairs of stiff, chartaceous bracts and bearing 5 to 9 flowers, which at least initially are subtended by one bract each but lack bracteoles. Floral structure is also remarkably similar: male flowers are tetramerous and bear minute, completely sessile anthers and, most unusual of all, have no aborted style, its place being taken by a central, basal cushion that may be a nectary. Notwithstanding such evidence of close affinity, the differences more than warrant specific separation: *C. roraimensis* has very thick, coriaceous leaves elliptic to ovate in shape and with obscure venation, while *C. peruviana* has thin, broadly lanceolate leaves with evident, pinnate venation. Additionally, the flowers of the former are sessile and have a smooth basal cushion, and those of the latter are short-pedicellate with a papillate basal cushion. The affinity of *C. alternifolia* from easternmost Brazil to *C. roraimensis*, as mooted under No. 37 above, renders the suggested *C. peruviana*–*C. roraimensis* affinity even more intriguing.

A second possible relative of *Cladocolea peruviana* is *C. archeri* (Smith) Kujit, which ranges from northern Peru to northern Colombia and so far is the most southerly member of the genus. However, close scrutiny reveals a number of significant contrasts, the most prominent of which is the dioecy of *C. peruviana*. Additionally, the latter's inflorescence is much smaller than that of *C. archeri*, which may reach 5 cm; *C. peruviana* also has fewer flowers, which, moreover, are pedicellate rather than sessile. The prominent lenticels that characterize young internodes of *C. archeri* likewise are absent in *C. peruviana*. Nevertheless, the determinate inflorescence, tetramerous flowers, and the basal chartaceous scales of the inflorescence in the new species strongly indicate an affinity with *C. archeri*. A species more remotely related may be *C. coriacea* Kujit, which also has tetramerous flowers and possibly has similar male flowers lacking styles (Kujit, 1987). Its flowers are also pedicellate, but the inflorescence is indeterminate and not subtended by chartaceous scales.



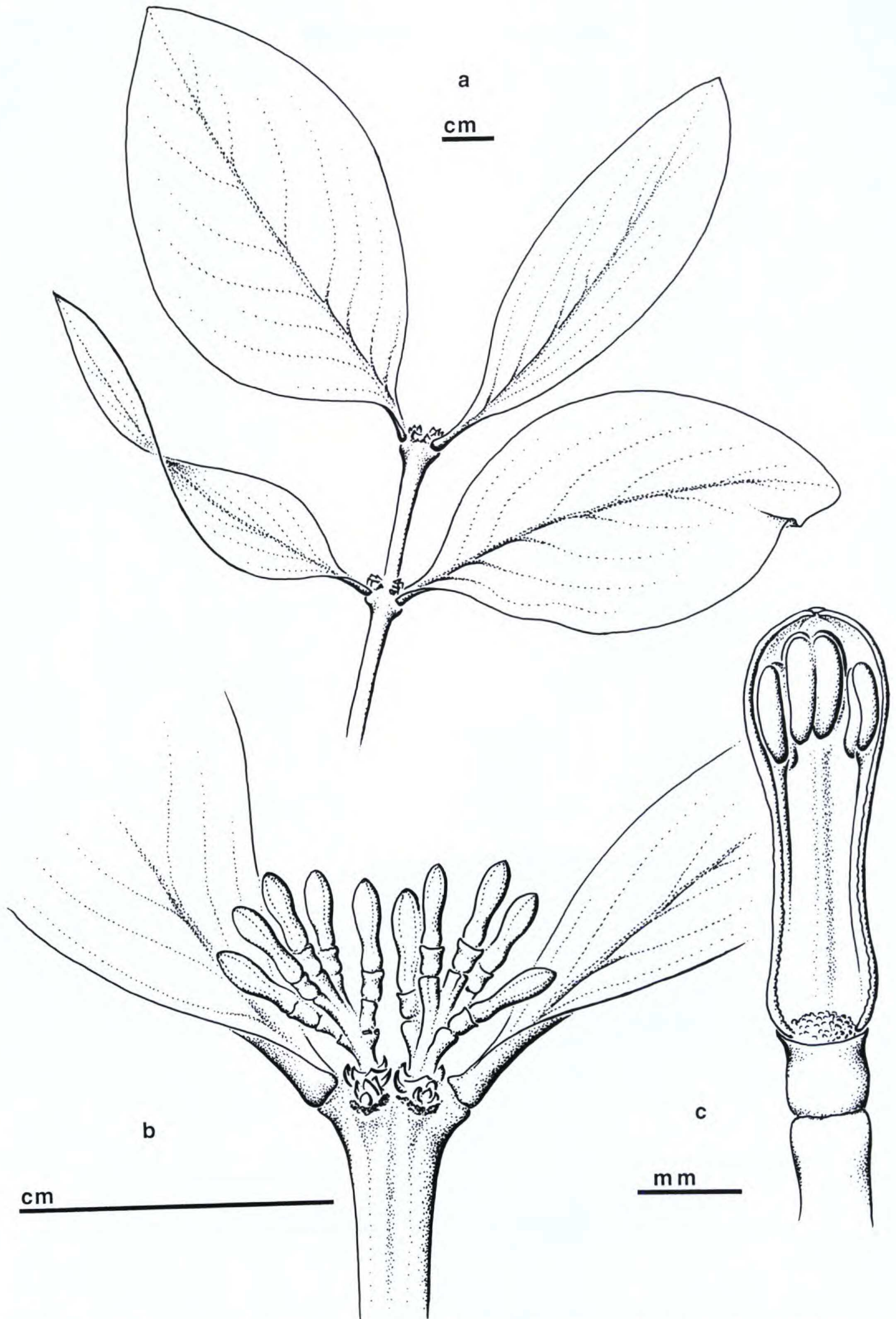


Figure 4. *Cladocolea peruviana* Kuijt. —a. Habit: upper portion of innovation. —b. Apex of innovation, apparently aborting, with 2 axillary inflorescences in bud, and 2 of the 4 associated buds. —c. Dissection of mature male bud, the nearest petal removed. Drawn from *Gentry & Smith 45173* (LEA).



- 40. *Struthanthus andersonii*** Kuijt, sp. nov. TYPE: Brazil. D.F.: trail to Cachoeira do Tororó, ca. km 10, area near IBGE Ecological Reserve, left of name plate of Fazenda Santa Prisca, R. Marquete, A. Vaz, V. L. G. Klen, L. Silvestre & D. Alvarenga 2587 (holotype, LEA; isotype, IBGE not seen). Figure 5.

Planta dioecia, internodia teretia, 3–6 cm longa. Folia  $10 \times 3$  cm, lanceolata, venatione manifeste pinnata, apice acuta, basi obtusata, petiolo manifesto usque ad 1 cm longo. Inflorescentia usque ad 1 cm longa, ex floribus sessilibus in triades unijugas dispositis constans; bracteis persistentibus. Alabastrum 3–5 mm longum.

Plants dioecious, internodes 3–6 cm, terete; the base of innovations and inflorescences surrounded by corky craters. Leaves to  $10 \times 3$  cm, lanceolate, apex acute to somewhat attenuate, base abruptly contracted to truncate, petiole to 1 cm, distinct; venation pinnate, evident. Inflorescences  $< 1$  cm, peduncle 2–4 mm, arising in clusters in leaf axils of older growth only, bearing 2 sessile triads, bracts and bracteoles persistent even in fruit. Male buds strongly clavate, 3–5 mm, the tip 2 mm wide and very blunt, calyculus finely dentate, stamens dimorphic, anthers 1 mm, without connectival horn, filaments rather stout, extending down on the petal as a fleshy ridge; style 1.5 mm, very slender, stigma undifferentiated. Female buds narrowly cylindrical, petals 4 mm, linear, calyculus as in the male, sterile anthers and filaments distinct, minute, dimorphic, style straight, nearly as long as the petals, stigma distinct, capitate. Fruit  $4.5 \times 2.5$  mm, ellipsoidal.

The new species *Struthanthus andersonii* may be related to *S. confertus* (Martius) Martius in that it has very similar inflorescences, but it has a very different leaf shape and, unlike the latter species, seems to flower only on older wood, new innovations being sterile. The species also shows a great deal of similarity to *S. vulgaris* (Martius) Martius, but its leaves are longer, it has smooth rather than lenticel-dotted internodes, its flowers are sessile, and both bracts and bracteoles are persistent even in fruit. The Costa Rican species *S. quadrangularis* Kuijt is also somewhat similar but has strongly quadrangular stems, obscure lateral venation, and 2 to 3 pairs of triads (Kuijt, 1990).

*Struthanthus andersonii* is named after the collector of one of the paratypes, William R. Anderson of the University of Michigan, renowned specialist on Malpighiaceae.

*Paratypes.* BRAZIL. **Goiás:** Serra Geral do Paraná, 3 km by road S of São João da Aliança, cerrado and gallery forest along river, 1040 m, W. R. Anderson et al. 7773

(LEA, NY). **Espírito Santo:** Linhares, Reserva Florestal de Linhares, aceiro, Cateln-Jueir, km 0, D. A. Folli 2049 (LEA).

- 41. *Struthanthus lewisii*** Kuijt, sp. nov. TYPE: Bolivia. La Paz: Inquisivi Prov., along the road between Miguillas and the cumbre between the Río Miguillas and the Río La Paz, deciduous forest,  $16^{\circ}32'S$ ,  $67^{\circ}22'W$ , 1300–1800 m, 30 Dec. 1989, M. Lewis 36955 (holotype, MO not seen; isotypes, LEA, LPB not seen). Figure 6.

Planta dioecia, sat parva, tomentosa, caulibus gracilibus. Folia tenua, ovata, venatione manifeste pinnata, apice acuta, basi obtusa vel truncata. Inflorescentia mascula axillaris, solitaria, 3–5 cm longa, ex floribus sessilibus in triades bi- vel trijugas dispositis constans; bracteis bracteolisque persistentibus. Flos masculus alabastro ca. 5 mm longo, parte principali ellipsoidali.

Dioecious, slender, small-leaved, much-branched plants, even the youngest leaf blades glabrous, but petioles and stems (including those of the inflorescence) densely white-, short-tomentose, internodes 4–6 cm, terete, with epicortical roots; vegetative laterals with 1 to 3 pairs of short, blunt to acute basal scale-leaves. Foliage leaves to  $4.5 \times 2$  cm, thin, ovate, apex acute, base truncate or nearly so, midvein distinct, running into apex, venation pinnate. Female plant and fruit not known. Male inflorescence 3–5 cm, slender, possibly subtended by small, caducous leaf scales but without any basal crater, peduncle 1–2 cm, keeled to somewhat angular; triads in 2 or 3 pairs, triad peduncles 3–4 mm, bracts and bracteoles deltoid, of comparable size, persistent; buds 5 mm, hexamerous, 1 mm of which is the ovary, the upper  $2/3$  fusiform, tip  $\pm$  acute, calyculus reflexed at least when dry, with numerous short marginal hairs; stamens strongly dimorphic, anthers 1 mm, versatile, the lower series with well-developed, acute connectival horn.

To my knowledge, only one other South American small-flowered member of Loranthaceae develops an indumentum, sharing that character with *Struthanthus lewisii*. This is *Phthirusa trichodes* Rizzini, a very different, curious species of Venezuela, Guyana, and adjacent Brazil, which has inflorescences with two sessile triads each, these bearing sessile, tetramerous flowers.

- 42. *Struthanthus longibracteatus*** Kuijt, sp. nov. TYPE: Peru. Madre de Dios: Manu, Parque Nacional de Manu, Río Manu, Cocha Cashu Station, floodplain forest,  $11^{\circ}50'S$ ,  $71^{\circ}25'W$ , 350 m, on *Tessaria*, R. Foster 9846 (holotype, MO not seen; isotype, LEA). Figure 7.

Planta dioecia, glabra, caulibus gracilibus, teretibus.



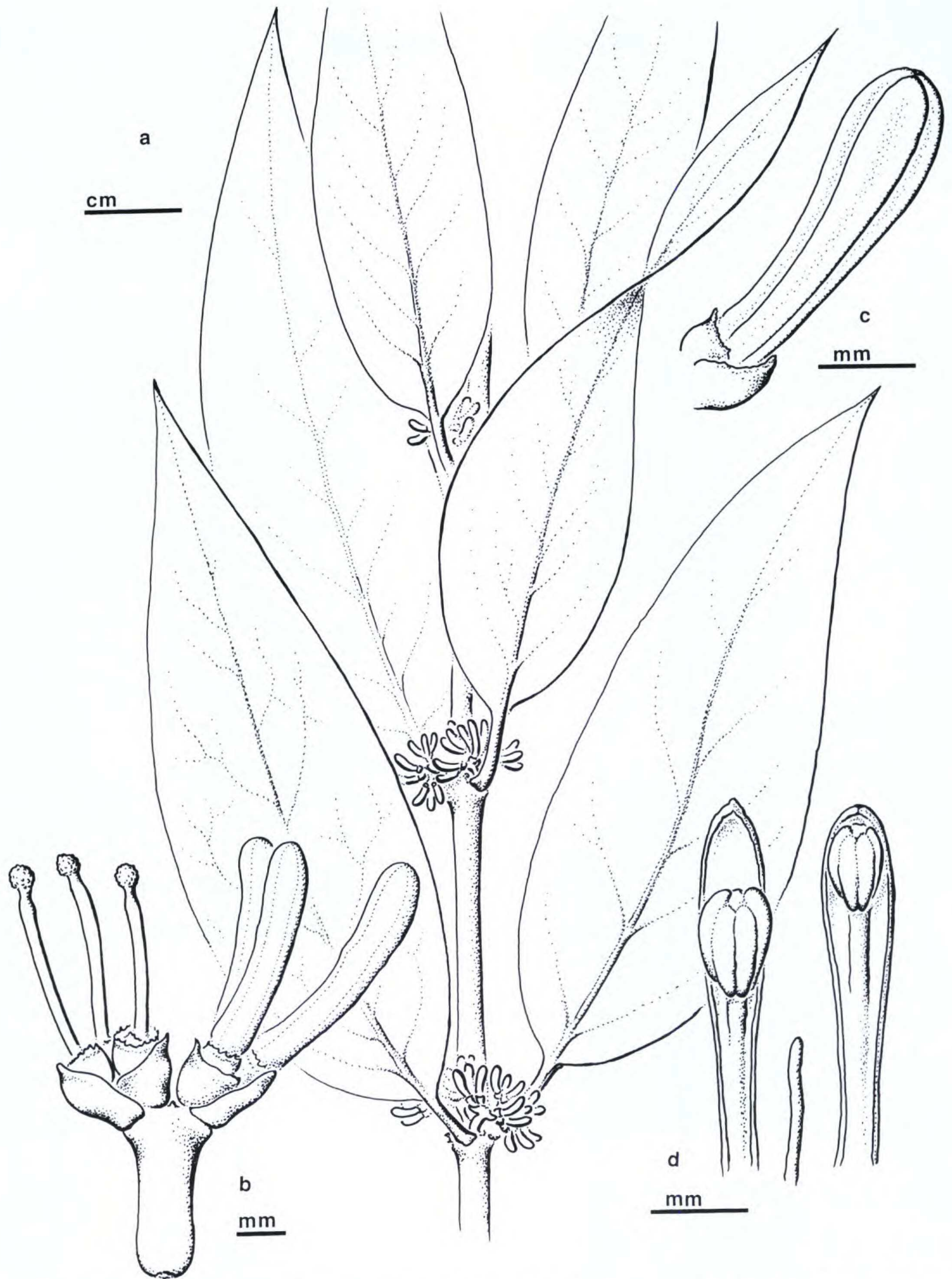


Figure 5. *Struthanthus andersonii* Kuijt. —a. Habit. —b. Female inflorescence. —c. Male bud. —d. Dissected floral organs of male flower. Drawn from *Marquete et al.* 2587 (LEA).



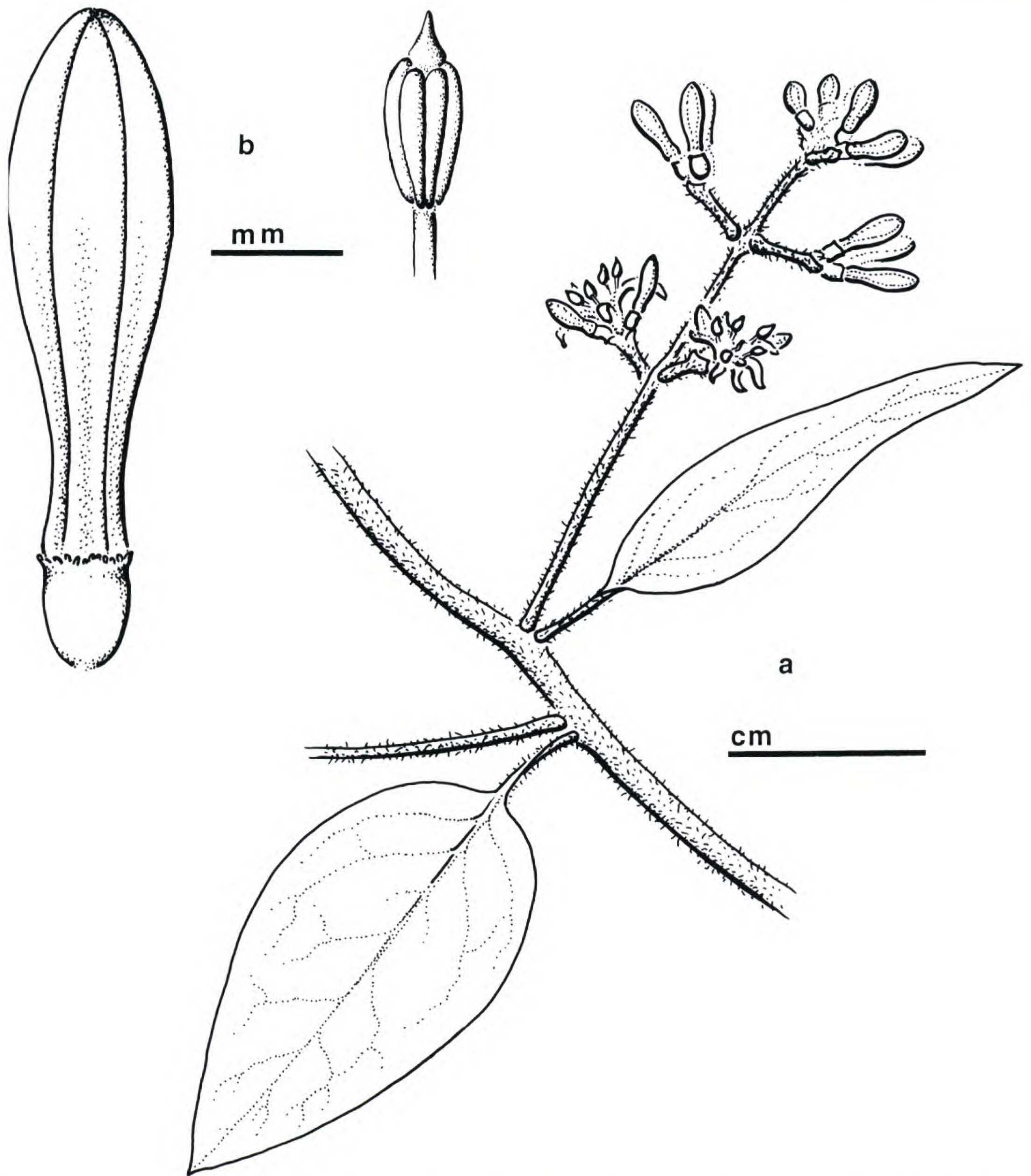


Figure 6. *Struthanthus lewisii* Kuijt. —a. Habit of male plant. —b. Mature male bud and lower anther. Drawn from Lewis 36955 (LEA).

Folia tenua, usque ad  $7 \times 2.5$  cm, lanceolata vel elliptica, venatione pinnata, apice obtusa, petiolo gracili usque ad 1.5 cm longo. Inflorescentia usque ad 5 cm longa ex floribus in triades bi- vel trijugas dispositis constans; bracteis 2–3 mm longis, recurvatis, interdum foliaceis; bracteolis loriformibus.

Slender, dioecious, glabrous plants, internodes terete, 5–7 cm, with occasional epicortical roots. Leaves to  $7 \times 2.5$  cm, thin, lanceolate to elliptical, apex obtuse, base acutely tapering into

slender petiole to 1.5 cm; venation pinnate, midvein running into apex. Female inflorescence to ca. 5 cm, the two minute prophyllar bracts mostly moved upward on the inflorescence axis for 4–7 mm and caducous, but sometimes remaining at the base, usually followed by a second pair of minute, caducous scale leaves somewhat higher; triads in 2 or 3 pairs, on the upper half of the inflorescence, triad peduncle to 4 mm, primary



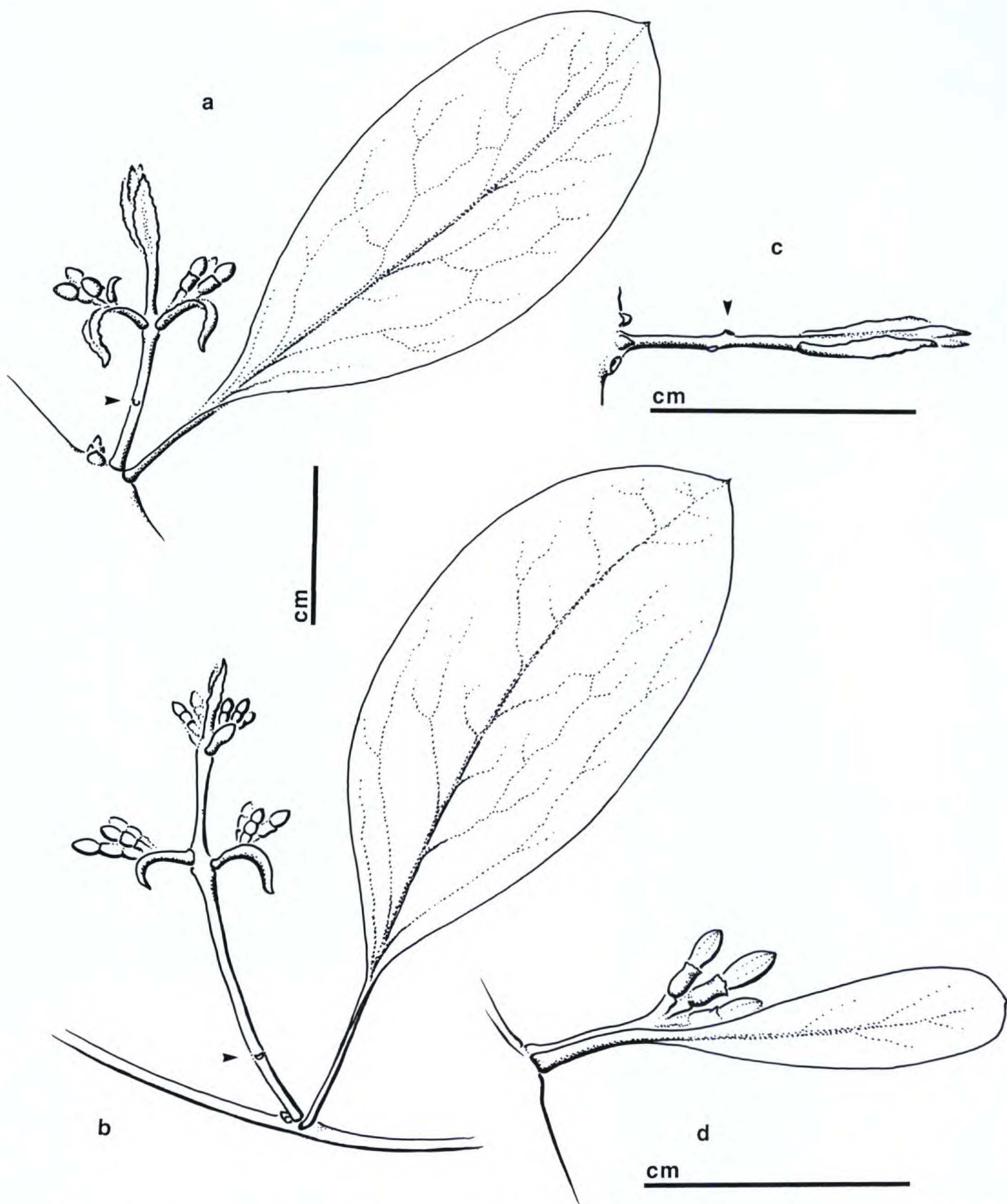


Figure 7. *Struthanthus longibracteatus* Kuijt. —a, b. Habit, with inflorescences in two early stages of development. —c. Very young axillary inflorescence, the triad bracts still erect and obscuring the flower buds. Arrows indicate bracts or bract scars on peduncles. —d. Female inflorescence triad with foliaceous primary bract. Drawn from *Foster 9846* (LEA).

bract acicular, 2–3 mm long, recurved, persistent; flowers on pedicels ca. 2 mm long, lateral ones with narrow, strap-like, caducous bracteoles; flower buds 4 mm long, half of which is a cylindrical ovary, calyculus with short-papillate margin; primary bract sometimes foliar and to 14 mm long. Male plant and fruit not known.

One of the most distinctive species of *Struthanthus*, with a unique leaf shape, and long, acicular bracts, which, in contrast to the bracteoles, are persistent. Known only from the type, which, unfortunately, does not have fully developed buds, denying us the possibility of further morphological details.



- 43. *Struthanthus tortistylus*** Kuijt, sp. nov.  
 TYPE: Ecuador. Pastaza: Kapawí (Amuntai),  
 Río Pastaza, on pasture tree, 2°31'S, 76°48'W,  
 235 m, 14–20 July 1988, W. H. Lewis, M. El-  
 vin-Lewis, C. E. Cerón, E. J. Kennelly & M. C.  
 Gnerre 13615 (holotype, MO; isotype, LEA).  
 Figure 8.

Planta dioecia, robusta, glabra, caulibus teretibus. Folia ovata, usque ad 10 × 4.5 cm, venatione pinnata, apice attenuata, basi obtusa, petiolo ca. 1 cm longo. Inflorescentia feminea ca. 4 cm longa, squamis basalibus bijugis subtenta, a floribus sessilibus in triades ca. 4-jugas tum monades uni- ad trijugas tum florem terminalem solitarium dispositis constans. Flos feminea stylo contortissimo.

Rather large, dioecious, glabrous plants, internodes 3–8 cm, terete. Leaves to 10 × 4.5 cm, shiny when dry, apex attenuate, base obtuse, petiole 1 cm, distinct; venation pinnate, even the minor venation evident, midvein running into apex, with four basal lateral veins running 4/5 of the length of the blade. Male plant not known. Female inflorescence ca. 4 cm, without basal crater but subtended by 2 or more small, blunt, partly caducous leaf scales; axis angular, peduncle 4–6 mm, followed by about 4 pairs of triads and 1 to 3 pairs of ebracteolate monads and a single terminal flower; triads and flowers sessile, bracts and bracteoles caducous. Flower 3.5 mm, ovary 1 mm, sterile anthers extremely small, ovate, essentially sessile. Style perhaps twice as long as the petals, tightly contorted even after anthesis; stigma large, capitate. Fruit (immature) ovoid, apex blunt, calyculus irregularly dentate. Male plant not known.

The curiously contorted style of *Struthanthus tortistylus* is a unique feature in South American Loranthaceae. A Brazilian species of *Phthirusa*, *P. cochliostyla* Ule, comes to mind because of its specific epithet but, although its type is no longer extant, it is clearly a (male) *Phthirusa*, now synonymized under *P. stelis* (L.) Kuijt (Kuijt & Kellogg, 1996). It is only in Mexican species of *Struthanthus* (Kuijt, 1975b) and *Cladocolea* (Kuijt, 1975a) that comparable styles exist. The styles of male flowers in those species are also contorted, but somewhat less so than in the female; the same may be expected in *S. tortistylus*. In all cases, the configuration of the style remains unaltered throughout anthesis until the style falls away afterwards. The functional meaning of this feature is puzzling, but may somehow be connected to the bizarre behavior of the embryo sac, which, in Loranthaceae, grows into the style, where fertilization takes place (Kuijt, 1969; Venturelli, 1981).

Actual relationships of *Struthanthus tortistylus*,

rather than with any Mexican species, seem to be with *S. leptostachyus* (Kunth) G. Don and *S. polystachyus* (Ruiz & Pavón) G. Don. This is suggested by the occurrence of ebracteolate monads and a terminal flower on the inflorescence; additionally, the sessile triads and flowers and the caducous basal inflorescence scales and triad bracts are held in common by these three species.

#### VISCACEAE

- 44. *Dendrophthora equisetoides*** Kuijt, sp. nov.  
 TYPE: Ecuador. Napo-Pastaza: Mera, M. Lugo  
 121 (holotype, S). Figure 9.

Planta gracilis, ramosissima, aphylla, monoecia, caulibus teretibus. Inflorescentia terminalis ex internodiis fertilibus 1 ad 3, inferioribus masculis summa feminea flores bi- vel triseriatos gerentibus constans. Bacca in diam. 4 mm, subglobosa, usque ad 4 mm in diam.

Monoecious plants, squamate, divaricate, mostly percurrent but with (apparently only) terminal inflorescences; internodes to 4.5 cm long, slender, terete; basal cataphylls one rather small pair 3–7 mm above the base, not tubular. Inflorescences subtended by 1 to 5 vegetative internodes (beyond basal cataphylls), and consisting of 1 to 3 fertile internodes, the terminal female, the remaining one(s) male; male fertile internodes ca. 13 mm long, female ones to 20 mm; male flowers ca. 11 per series, exceedingly small, anthers unilocular, female flowers to ca. 8 per series, on a somewhat swollen fertile internode; both male and female flowers biseriate or triseriate, even on the same inflorescence. Fruit ca. 4 mm diam., somewhat depressed-globose, petals very small, parted to erect.

*Dendrophthora equisetoides* is a truly extraordinary species, known only from the holotype, and with no evident relatives in the genus, although its sex distribution is similar to that of *D. clavata* (Benth.) Urban and, perhaps more to the point, to the *D. basiandra* Kuijt illustrated in Kuijt (1986, fig. 41), which is now known as *D. macbridei* (Standley) Kuijt (Kuijt, 2000). I have seen no evidence of anything but terminal inflorescences, which would be unique at least in South American species of the genus. *Dendrophthora equisetoides* shows a striking general resemblance vis-à-vis some Caribbean *Dendrophthora* species such as *D. domingensis*, but its peculiar inflorescence construction is at once distinctive. Even though the flowers are excessively small, the anther is clearly unilocular.

- 45. *Dendrophthora harlingii*** Kuijt, sp. nov.  
 TYPE: Ecuador. Morona-Santiago: end of road



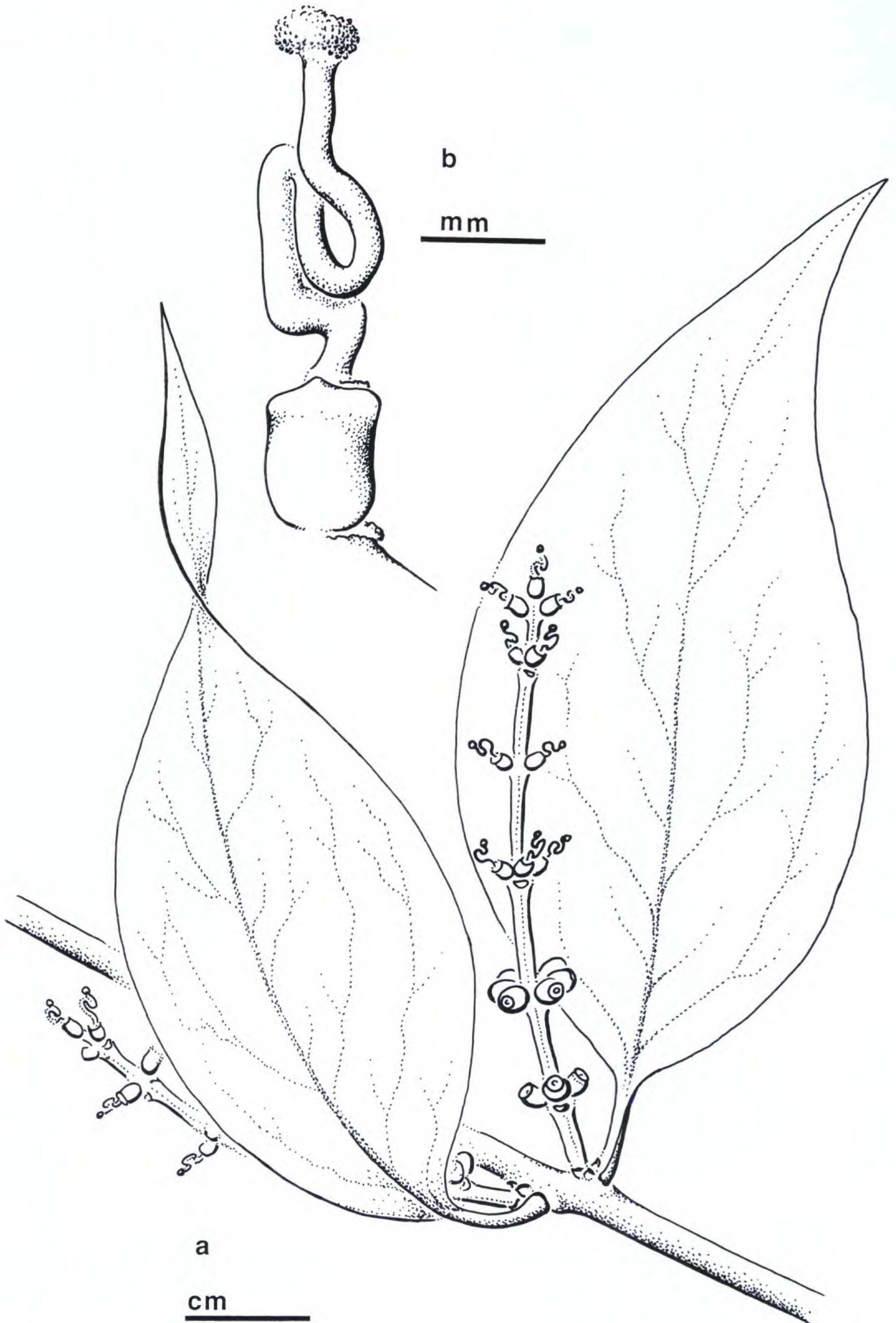


Figure 8. *Struthanthus tortistylus* Kuijt. —a. Habit. —b. Ovary and style. Drawn from *Lewis et al. 13615* (LEA).



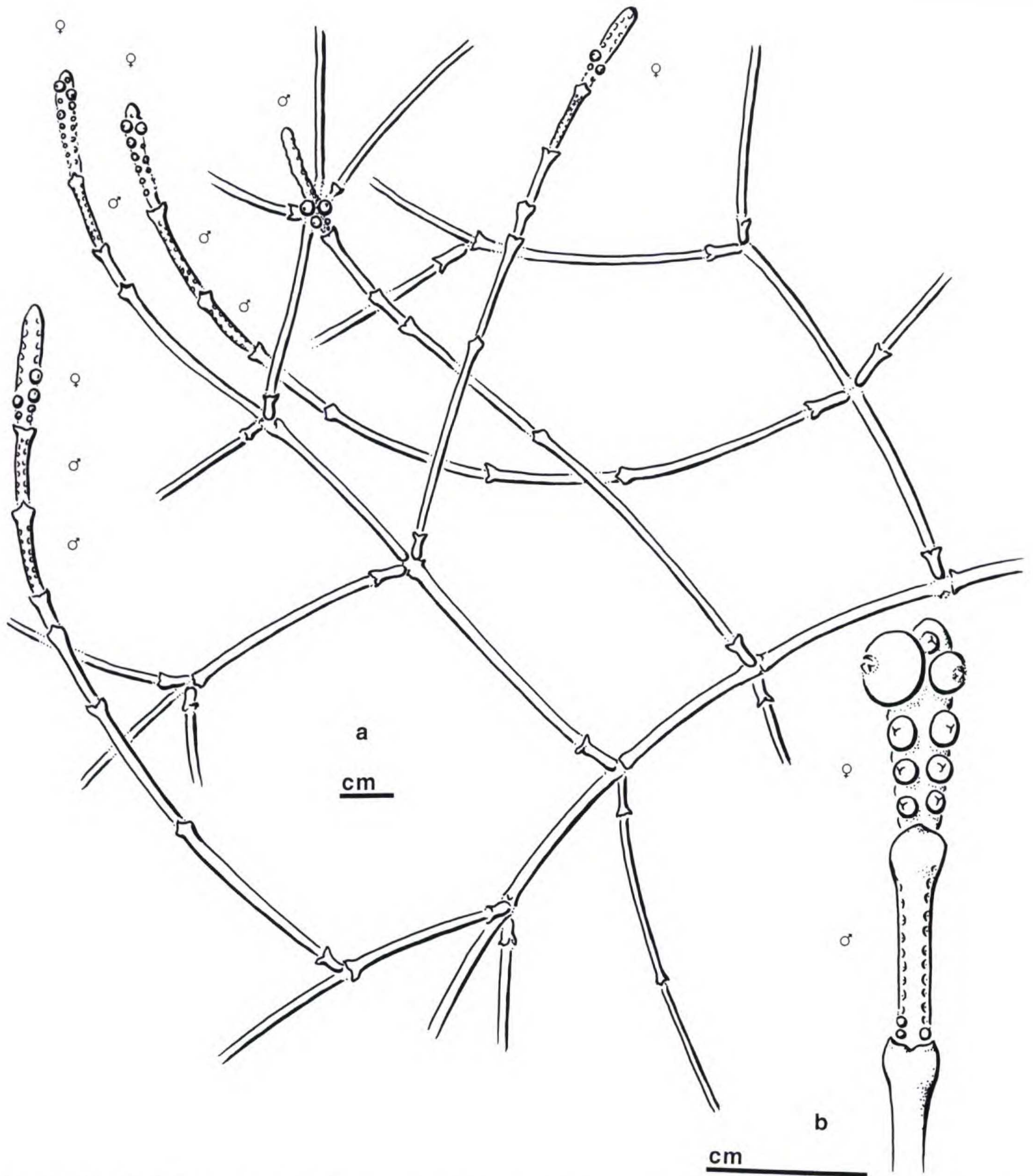


Figure 9. *Dendrophthora equisetoides* Kuijt. —a. Habit. —b. Inflorescence, the terminal fertile internode female, the basal one male. (♀ = female internode, ♂ = male internode.) Drawn from *Lugo 121* (S).

in construction, Limón–La Unión, ca. 10 km from Limón, primary moist forest, 1400 m, on *Ochroma*, 27 Feb. 1993, G. Harling & B. Stahl 26727 (holotype, S). Figure 10.

Planta glabra subcarnosa, dioecia. Cataphylla basalia unijuga; folia usque ad  $4 \times 2.5$  cm, obovata vel late cuneata. Inflorescentia mascula usque ad 1.5 cm longa ex internodio fertili solitario constans, floribus triseriatis usque ad 50 unaquaque bractea fertili subtentis. Inflorescentia feminea usque ad 1 cm longa ex internodio fertili

solitario constans, floribus 3 unaquaque bractea fertili subtentis.

Plants dioecious, glabrous, somewhat succulent, internodes mostly to 5 cm,  $\pm$  terete to very slightly keeled; basal cataphylls one rather inconspicuous pair, 2–5 mm above the base. Leaves to  $4 \times 2.5$  cm, obovate to broadly cuneate, apex rounded to slightly emarginate, base acutely tapering to short (ca. 2 mm), indistinct petiole; venation obscure but



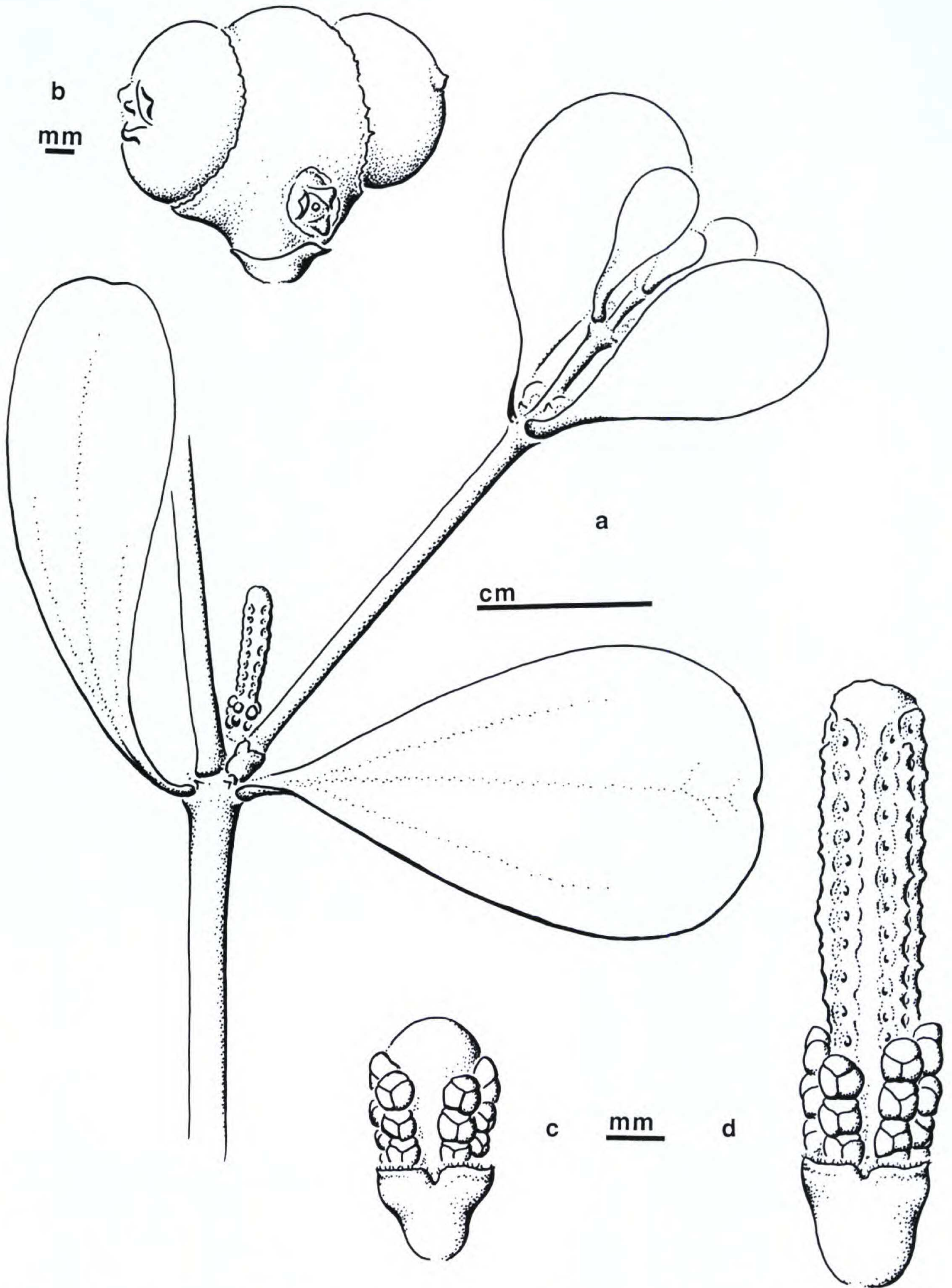


Figure 10. *Dendrophthora harlingii* Kuijt. —a. Habit. —b. Female inflorescence with 2 mature fruits. —c. Young male inflorescence. —d. Older male inflorescence. Drawn from *Harling & Stahl 26727* (S).



the midvein flanked by two major basal veins. Both male and female inflorescence types with very short, simple peduncle 1–2 mm, followed by one fertile internode. Male inflorescence < 1.5 cm long, flowers to 50 per fertile bract, regularly triseriate, the terminal, exhausted part of the fertile internode becoming rod-like. Female inflorescence < 1 cm long, flowers mostly 3 per fertile bract, the fertile internode swollen to 6 mm in fruit, and investing the bases of at least the young fruits. Fruits about 1 cm in width, longitudinally compressed, in shape a thick, rounded disk, white, with small, recurved petals.

*Dendrophthora harlingii* is a species closely related to *D. dalstroemii* Kuijt, but with some sharp differences. *Dendrophthora dalstroemii* has irregularly uniseriate flowers, the inflorescence peduncle making up about half of the length of the entire inflorescence, which mostly has 2 fertile internodes; it lacks basal cataphylls; and its leaves are consistently ovate rather than obovate. Finally, its fruiting internode does not show the distinctive swelling that characterizes *D. harlingii*.

*Dendrophthora harlingii* is perhaps more closely related to *D. cuneifolia* Kuijt from Venezuela (Kuijt, 1990), which, in general appearance, resembles it strikingly. *Dendrophthora cuneifolia* is monoecious, however, with unisexual inflorescences of both types occurring even on the same twig. Additionally, that species bears to 30 or more female flowers per fertile internode, and the flower seriation of the male inflorescence soon becomes irregular, while it remains strictly triseriate in *D. harlingii*, even on old inflorescences. The fruit of *D. harlingii* also appears much larger, and longitudinally compressed rather than more or less globular, but the shape of fruits is difficult to ascertain from herbarium material. Finally, inflorescence peduncles in *D. cuneifolia* may be up to 1 cm long, while those of *D. harlingii* rarely exceed 1 mm; and basal cataphylls are absent in the former, present in the latter.

Yet another species that may well be related is *Dendrophthora virgata* (Trelease) Kuijt as illustrated in Kuijt (1980), which differs in having male and female inflorescence peduncles to 6 mm long, to 10 flowers per female fertile bract, and much smaller (< 4 mm) leaves.

*Paratype.* As the type, *Harling & Stahl 26737* (S).

**46. *Dendrophthora meridana* Kuijt, sp. nov.**  
 TYPE: Venezuela. Trujillo, border with Lara: Parque Nacional Dinira, Páramo de Jabón, fila cerca de la cumbre del Pico Jabón, shrubby páramo vegetation between boulders and rocky

escarpments, 9°34'24"N, 70°07'03"W, 3100 m, 14 Aug. 1999, *R. Riina, R. Duno, R. Ghinaglia & R. Gonto 623* (holotype, VEN 301604). Figure 11.

Planta monoecia, glabra, erecta, sat carnosae, caulibus teretibus; cataphylla basalia nulla; folia usque ad 13 × 3 mm, oblanceolata. Inflorescentia mascula in axilla prophylli posita, floribus triseriatis usque ad 18 unaquaque bractea fertili subtentis. Inflorescentia feminea in axilla folii posita, floribus 4(6) triseriatis unaquaque bractea fertili subtentis.

Rigidly erect, glabrous, monoecious plants ca. 30 cm in height, densely branched, internodes to 2.5 cm long, terete, basal cataphylls absent, basal phyllotaxy transverse. Leaves to 13 × 3 mm, oblanceolate, fleshy, apex obtuse or nearly so, base cuneate, petiole indistinct; venation obscure. Inflorescences with separate sexes, to ca. 12 mm long, triseriate, peduncles 4 to 5 mm, simple, fertile internode one. Male inflorescences in secondary positions or lowest on lateral branches, to 10 mm long, flowers to about 18 per fertile bract. Female inflorescence mostly in primary axillary positions, flowers 4(6) per fertile bract. Fruit 2 × 2 mm, globose, white, petals spreading.

The small-flowered species of *Dendrophthora*, especially in the Bolivian and Venezuelan Andes, are in great need of revision, and the present species resembles a number of those that have already been described. The known and similar species differ from *D. meridana* in characteristics involving basal cataphylls, number of flowers per fertile bract, the number of fertile internodes per inflorescence, in being short-tomentose, and in their male and female flower distribution and leaf morphology. I have scrutinized the species known so far (Kuijt, 2000) and cannot match the present species with any known one. A similar but not quite identical distributional pattern of male and female inflorescences has been noted for another Venezuelan species, *D. cuneifolia*, which may be closely related but has a very different leaf shape and size, and nearly twice as many female flowers per fertile bract (Kuijt, 1990).

The specific epithet refers to the Cordillera de Mérida, where both known specimens were collected. The holotype is a unicate.

*Paratype.* VENEZUELA. **Mérida:** Sierra Nevada, near Alto del Aguada, 300–3500 m, *L. Bernardi et al. 17111* (LEA).



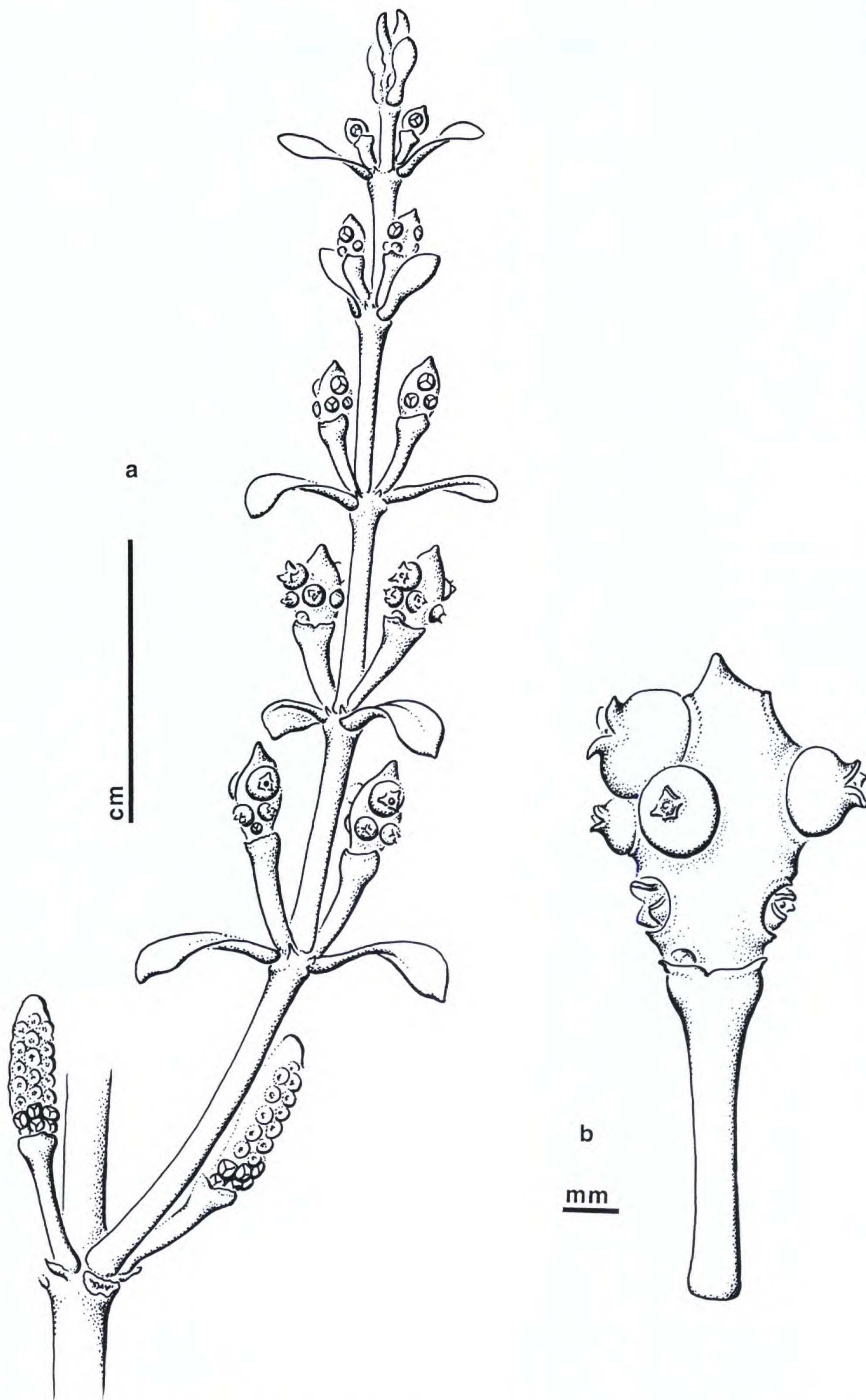


Figure 11. *Dendrophthora meridana* Kuijt. —a. Habit, lateral branch with female inflorescences flanked by two male inflorescences in prophyllar positions. —b. Young infructescence. Drawn from *Riina et al.* 623 (VEN).



**47. *Dendrophthora warmingii*** (Eichler) Kuijt, comb. nov. Basionym: *Phoradendron warmingii* Eichler, in Warming, Vidensk. Meddel. Dansk. Naturhist. Foren. Kjoebenhavn. 209. 1870. TYPE: Brazil. Lagoa Santa, on *Vochysia elliptica*, 14 Jan. 1865, E. Warming 383 (holotype, C).

*Dendrophthora tepuiana* (Steyermark) Kuijt, Proc. Kon. Ned. Akad. Wetensch. 93: 138–139. 1990. Venezuela. Bolívar: Ptari-tepuí, 1600 m, Steyermark 59688 (holotype, F; isotype, US).

I have found, in the holotype of *Dendrophthora warmingii*, two instances of an apparently female flower with a small anther on one of the petals, as happens very occasionally in *Phoradendron* and *Dendrophthora*. These anthers, although underdeveloped, were almost certainly unilocular and, on the basis of this character, I feel confident about the assignment of this species to *Dendrophthora*. It should be noted that *Phoradendron rugulosum* Urban, which Rizzini (1991) recombined to *Phoradendron warmingii* Eichler var. *rugulosum* (Urban) Rizzini, is a synonym of *P. pteroneuron* Eichler (Kuijt, 2003).

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